Remarks:

Reconsideration of the application is requested.

Claims 1-4, and 10-16 remain in the application. Claims 1, 10, 14 and 16 have been amended. Claims 5-9 and 17-23 have been cancelled.

In item 1 on pages 2-3 of the above-mentioned Office action, claims 1-17 have been rejected as being anticipated by Summerfelt et al. (US Pat. No. 5,612,574) under 35 U.S.C. § 102(b).

The rejection has been noted and claim 1 has been amended in an effort to even more clearly define the invention of the instant application. More specifically, the features of claims 5, 7 and 9 have been added to claim 1.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 1 calls for, inter alia:

> at least one barrier layer provided over said base substrate, said at least one barrier layer including an oxygen-containing iridium layer and an oxygen barrier layer, said oxygen barrier layer being composed of one of iridium dioxide and ruthenium dioxide; and
>
> an adhesion layer disposed between said base substrate and said at least one barrier layer, said adhesion layer containing at least one material selected from the group

consisting of zirconium, hafnium, cerium, vanadium, chromium, niobium, tantalum nitride, titanium nitride, tantalum silicide nitride and tungsten silicide.

The invention of the instant application is different from Summerfelt et al. in the following aspects:

1) Summerfelt et al. disclose an adhesion layer 26 which may contain titanium, tantalum, ruthenium or other suitable material (see column 4, lines 28-29). However, the adhesion layer (20) according to the invention of the instant application may contain numerous other materials other than titanium and tantalum.

2) Summerfelt et al. disclose a barrier layer 22 which may contain, among others, Ir-Si-O (see column 3, line 61 to column 4, line 11, especially column 4, line 8). In contrast, the barrier layer (25, 30) according to the invention of the instant application includes an oxygen-containing iridium layer (25) and an oxygen barrier layer (30). The oxygen barrier layer is composed of iridium dioxide or ruthenium dioxide. The barrier layer according to the invention of the instant application does not contain any silicon.

3) According to the invention of the instant application, there is a separate metal silicide layer (9) between the adhesive layer (20) and the opening (10) (see claim 2).

4) In Summerfelt et al., the conductive material 20 may contain tantalum silicide, molybdenum silicide, and tungsten silicide (see column 3, lines 37-40). However, the metal silicide layer (9) according to the invention of the instant application may contain numerous other silicides besides tantalum silicide, molybdenum silicide, and tungsten silicide (see claim 14).

5) In Summerfelt et al., there is a layer 28 which is composed, among other things, of ferroelectric material and contains a metal-oxide. However, the metal-oxide-containing layer (40) according to the invention of the instant application, in addition to ferroelectric material, can also be a paraelectric layer.

The absence of iridium silicide (or Ir-Si-O) in the invention of the instant application, which is present in Summerfelt et al., results in a considerable reduction of specific resistance (see page 11, line 20 to page 12, line 19 of the specification of the instant application). In addition, an oxygen-containing iridium layer without iridium silicide can

be more simply fabricated (see page 12, line 21 to page 14, line 8 of the specification of the instant application).

The choice of numerous other materials for the metal silicide layer and the adhesive layer provides additional structual possibilities for the microelectronic structure. For example, the material provided by the invention of the instant application for the adhesion layer (20) can especially improve the adhesion (see page 22, lines 1-13 of the specification of the instant application).

It is especially important that the barrier layer according to the invention of the instant application includes an oxygen-containing iridium layer (25) and an oxygen barrier layer (30) which is composed of iridium dioxide or ruthenium dioxide. This can fully protect the adhesion layer (20) from oxygen attack, and produce a good contact between the oxygen-containing iridium layer (25) and the noble metal layer (35) (see page 23, line 21 to page 24, line 12 of the specification of the instant application).

The Ir-Si-O described in Summerfelt et al. for the barrier layer is not very suitable as a contact material because of its high specific resistance.

Clearly, Summerfelt et al. do not show "said at least one barrier layer including an oxygen-containing iridium layer and an oxygen barrier layer, said oxygen barrier layer being composed of one of iridium dioxide and ruthenium dioxide; and said adhesion layer containing at least one material selected from the group consisting of zirconium, hafnium, cerium, vanadium, chromium, niobium, tantalum nitride, titanium nitride, tantalum silicide nitride and tungsten silicide", as recited in claim 1 of the instant application.

Claim 1 is, therefore, believed to be patentable over Summerfelt et al. and since all of the dependent claims are ultimately dependent on claim 1, they are believed to be patentable as well. Claims 2 and 14 are also believed to be patentable for the reasons discussed above.

In view of the foregoing, reconsideration and allowance of claims 1-4 and 10-16 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate a telephone call so that, if possible, patentable language can be worked out.

Please charge any fees which might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and

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Respectfully submitted,

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Marked-Up Version of the Amended Claims:

Claim 1(amended). A microelectronic structure, comprising:

a base substrate;

at least one barrier layer provided over said base substrate, said at least one barrier layer including an oxygen-containing iridium layer and an oxygen barrier layer, said oxygen barrier layer being composed of one of iridium dioxide and ruthenium dioxide; and

an adhesion layer disposed between said base substrate and said at least one barrier layer, said adhesion layer containing at least one material selected from the group consisting of [titanium,] zirconium, hafnium, cerium, [tantalum,] vanadium, chromium, niobium, tantalum nitride, titanium nitride, tantalum silicide nitride and tungsten silicide.

Claim 10(amended). The microelectronic structure according to claim 1, [wherein:] including

[said at least one barrier layer includes an oxygen barrier layer; and]

a metal-containing electrode layer [covers] covering said oxygen barrier layer.

Claim 14(amended). The microelectronic structure according to claim 12, wherein said at least one metal silicide contains at least one silicide selected from the group consisting of yttrium silicide, titanium silicide, zirconium silicide, hafnium silicide, vanadium silicide, niobium silicide, [tantalum silicide,] chromium silicide, [molybdenum silicide, tungsten silicide,] iron silicide, cobalt silicide, [nickel silicide,] palladium silicide, platinum silicide and copper silicide.

Claim 16(amended). [A] The microelectronic structure according to claim 1, further comprising:

[a base substrate at least partly composed of an insulating material and formed with an opening;

said opening completely penetrating through said insulating material;

at least one conductive material filling said opening and terminating flush with said insulating material;

a barrier layer disposed on said base substrate, said barrier layer including an iridium dioxide layer and an oxygen containing iridium layer;

said oxygen-containing iridium layer being a sputtered layer produceable at a temperature of at least 250°C in an atmosphere containing by volume between 2.5% and 15% of oxygen;

an adhesion layer disposed over said opening and directly between said base substrate and said barrier layer, said adhesion layer containing at least one material selected from the group consisting of titanium, zirconium, hafnium, cerium, tantalum, vanadium, chromium, niobium, tantalum nitride, titanium nitride, tantalum silicide nitride and tungsten silicide; and]

a noble metal layer disposed on said barrier layer.